CLAIMS

1. A formulation for use in therapeutic and/or cosmetic treatment, which formulation comprises:

at least one anti-sense polynucleotide to a connexin protein; together with a pharmaceutically acceptable carrier or vehicle.

2. A formulation according to claim 1, suitable for topical administration.

3. A formulation according to claim 1 or 2, wherein the polynucleotide is an oligodeoxynucleotide.

4. A formulation according to any preceding claim which contains polynucleotides to one connexin protein only.

5. A formulation according to claim 4 wherein said connexin protein is connexin 43, connexin 26, connexin 31.1, connexin 32 or connexin 36.

6. A formulation according to any of claims 1 to 3 which contains polynucleotides to more than one connexin protein.

7. A formulation according to claim 6 in which one of the connexin proteins to which polynucleotides are directed is connexin 43.

8. A formulation according to claim 6 which includes polynucleotides directed to at least two of connexin 26, connexin 31.1, connexin 32, connexin 36 and connexin 43.

9. A formulation according to claim 5, claim 7 or claim 8 in which the polynucleotide to connexin 43 is selected from:

GTA ATT GCG GCA AGA AGA ATT GTT TCT GTC;
GTA ATT GCG GCA GGA GGA ATT GTT TCT GTC; and
GGC AAG AGA CAC CAA AGA CAC TAC CAG CAT.

10. A formulation according to claim 5 or claim 8 in which the polynucleotide to connexin 26 is:

TCC TGA GCA ATA CCT AAC GAA CAA ATA.

11. A formulation according to claim 5 or claim 8 in which the polynucleotide to connexin 31.1 is:

CGT CCG AGC CCA GAA AGA TGA GGT C.

12. A formulation according to claim 5 or claim 8 in which the polynucleotide to connexin 32 is:

TTT CTT TTC TAT GTG CTG TTG GTG A.

13. A formulation according to any preceding claim in which the pharmaceutically acceptable carrier or vehicle is, or includes, a gel.

14. A formulation according to claim 13 in which the gel is a nonionic polyoxyethylene-polyoxypropylene copolymer gel.

15. A formulation according to any preceding claim which further includes a surfactant or urea to assist with polynucleotide penetration into cells.

16. A method of site-specific downregulation of connexin protein expression for a therapeutic and/or cosmetic purpose which comprises administering a formulation as defined in any one of claims 1 to 15 to a site on or within a patient at which said downregulation is required.

17. A method of reducing neuronal cell death which would otherwise result from a neuronal insult to a specific site in the brain, spinal cord or optic nerve of a patient which comprises the step of administering a formulation as defined in any one of claims 1 to 15 to said site to downregulate expression of connexin protein(s) at and immediately adjacent said site.

18. A method according to claim 17 in which the formulation is administered to reduce neuronal loss due to physical trauma to the brain, spinal cord or optic nerve.

19. A method according to claim 17 or claim 18 in which the formulation is administered in a sufficient amount to downregulate expression of said connexin protein(s) for at least 24 hours post-administration.

20. A method of promoting wound healing in a patient which comprises the step of administering a formulation as defined in any of claims 1 to 15 to said wound to downregulate expression of connexin protein(s) at and immediately adjacent the site of said wound.

21. A method according to claim 20 in which the wound is the result of trauma.

22. A method according to claim 21 in which the trauma is a burn.

23. A method according to claim 20 in which the wound is the result of surgery.

24. A method of reducing inflammation as part of treating a wound and/or tissue subjected to physical trauma which comprises the step of administering a formulation as defined in any one of claims 1 to 15 to, or proximate to, said wound or tissue.

25. A method according to claim 24 in which the formulation is administered to reduce inflammation due to physical trauma to the brain, spinal cord or optic nerve.

26. A method of decreasing scar formation in a patient who has suffered a wound which comprises the step of administering a formulation as defined in any one of claims 1 to 15 to said wound to downregulate expression of connexin protein(s) at and immediately adjacent the site of said wound.

27. A method of skin rejuvenation or thickening for a cosmetic or therapeutic purpose which comprises the step of administering, once or repeatedly, a formulation as defined in any one of claims 1 to 15 to the skin surface.

28. A method according to claim 27 wherein said formulation includes polynucleotide directed to connexin 43 and is administered to regulate epithelial basal cell division and growth.

29. A method according to claim 27 wherein said formulation includes polynucleotide directed to connexin 31.1 and is administered to regulate outer layer keratinisation.

30. A method according to any one of claims 27 to 29 wherein the formulation is a cream.

31. The use of at least one anti-sense polynucleotide to a connexin protein in the manufacture of a medicament for downregulating expression of said connexin protein for a therapeutic or cosmetic purpose.

32. The use of claim 31 wherein said medicament is for reducing neuronal cell death which would otherwise result from a neuronal insult.

33. The use of claim 31 wherein said medicament is for promoting wound healing.

34. The use of claim 31 wherein said medicament is for reducing inflammation.

35. The use of claim 31 wherein said medicament is for decreasing scar formation.

36. The use of claim 31 wherein said medicament is for skin rejuvenation for a cosmetic or therapeutic purpose.